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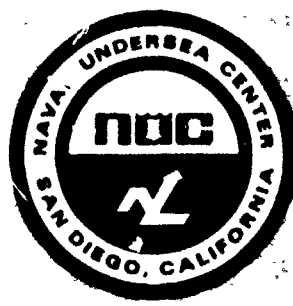CNO [N772] ltr N772A/6U875630, 20 Jan 2006 and ONR ltr 31 Jan 2006

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DOCUMENTATION FOR COMPUTER PROGRAM SUMARY:
A COMPUTER PROGRAM TO SUMMARIZE
SOUND SPEED PROFILE DATA,

BY

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SYSTEMS ANALYSIS GROUP (CODE 14)

OCT 73

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Naval Undersea Center, San Diego, California 92132

390 458

Abstract

A computer program, labeled SUMARY, has been written to summarize sound speed values computed from oceanographic station data. The program determines the following values at each of 40 standard depths from selected data populations:

      mean,
      variance
      standard deviation
      minimum,
      10th through 90th percentiles,
      first quantile,
      third quantile
      maximum,
      number of observations,

Summary data is available on punched cards for 146 of 240 ocean data populations.

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FOREWORD

This report is one of a series describing work to develop summary sound speed profile data for application in a variety of underwater acoustic problems. The work is under joint sponsorship of the Long Range Acoustic Propagation Project (LRAPP) and the Acoustic Environment Support Detachment (AESD) of the Office of Naval Research (ONR). The Fleet Numerical Weather Central (FNWC), Monterey, California is assisting in this project by furnishing computer time and physical support. The Naval Undersea Center (NUC), San Diego, California is furnishing a research oceanographer to perform and direct the work at FNWC, Monterey.

INTRODUCTION

This report is documentation for a FORTRAN Extended computer program which performs statistical manipulations and computations on oceanographic station data organized by time-space populations contained on magnetic tape. The program was written for operation on the CDC 6500 computer system at the Fleet Numerical Weather Central (FNWC), Monterey, California.

The acronym given this program is SUMARY. The purpose for SUMARY is to produce printouts of ordered sound speed data at 40 standard ocean depths; select eleven statistical percentiles and maximum and minimum values from the ordered sets; compute mean, variance and standard deviation from sound speed data at each of the 40 depths; and, finally, to punch the selected percentiles, maximum, minimum, mean, variance, standard deviation and number of observations into cards.

The 40 standard depths used for SUMARY are shown in Table I.

The current report is the third in a series describing work to develop summary sound speed data by specific ocean regions for application in a variety of underwater sound propagation problems. References 1 and 2 are other reports in this series.

INPUT

Input data to SUMARY is oceanographic station data assembled on magnetic tape by a program labeled TPCONV. These data are sound speed (C), temperature (T), salinity (S), and sigma-t (σ_t) at 40 standard levels. The data are grouped by specific ocean regions and by three month time periods. Appendix A is a layout of the input data tape format. NUC Technical Note 1223 presents a description of the generating program TPCONV.

OUTPUT DATA

SUMARY produces a series of printout listings and a deck of data cards.

The computer prints out 40 tables of ordered sound speed values. One for each of the 40 standard depths shown in Table I. The maximum value heads each list, the minimum value is at the end. The tables contain twenty decreasing values per line. The number of data values determines the number of lines. Table II is a typical ordered data list for sound speed values at depth 1, or 0 meters. The printed values are sound speed in meters per second minus 1000.

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TABLE I

STANDARD DEPTHS AND ASSOCIATED DEPTH NUMBERS USED FOR SUMARY

DEPTH NO.	DEPTH
1	0
2	10
3	20
4	25
5	30
6	35
7	50
8	75
9	100
10	125
11	150
12	200
13	250
14	300
15	400
16	500
17	600
18	700
19	800
20	900
21	1000
22	1100
23	1200
24	1250
25	1300
26	1400
27	1500
28	1750
29	2000
30	2500
31	3000
32	4000
33	5000
34	6000
35	7000
36	8000
37	9000
38	10000
39	11000
40	12000

ORDERED SOUND SPEED VALUES AT 0 METERS FOR AREA 2092

TABLE II

ORDERED LIST OF SOUND SPEED VALUES AT 0 METERS FOR AREA 1092

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A second type of output is the deck of data cards. This output card deck contains 80 cards, two cards of information for each of the 40 standard depths. The first card of each pair contains maximum, 10, 20, 30, 40, 50, 60, 70, 80, and 90th percentiles, minimum, first quantile, and third quantile sound speed values at a specific depth. This card also contains the depth number (see Table I), the number of sound speed observations in the population and the specific label given the data group. The second card for a specific depth contains standard deviation, variance, number of observations in decimal form, mean value, depth number, number of observations in integer form and the data group label. The program inserts a flag card containing 80 columns of nine (9) to separate data card groups. Appendix B is a description of the output data card format. Appendix C is a typical listing of an output data card deck.

GENERAL PROGRAM OPERATION

SUMARY was written to operate spec ifically on sound speed data. A simple program modification will permit operation on any one of the other, T, S, or σ_t data populations.

SUMARY will process one or more populations of sound speed data in a single run. A series of data cards directs the computer in selecting the appropriate data groups, or populations, from the input tape for processing. Appendix D is a description of the data cards format.

The computer central memory is insufficient to contain an entire potential data population at each of the 40 standard depths. For this reason the program reads data from the input tape and fills a holding buffer in central memory then outputs this buffer to disk storage. The program reads blocks of data, loads the holding buffer up to 500 observations at each of the 40 standard depths, then transfers the full buffer to disk storage before accepting more data. This process continues until a complete data population has been transferred from tape to disk. Upon completing the input transfer of data the program begins to operate on the data stored on disk. All data for one depth is brought from disk back into central memory. Once the entire data population from one depth is in central memory the program orders the values, computes mean, variance and standatd deviation and selects the minimum, maximum and eleven percentile values. The ordered list is then printed out and the appropriate data cards punched. This procedure continues through the 40 standard depths. The program then determines if another data group is to be processed or if the job is to end. This process continues until a data card directs the computer to end the job.

DATA CARDS

The series of cards which control the selection of data groups for processing include one or more data cards and a terminating flag card.

Each data card contains three fields. The first field is found in columns 1 through 5. The computer will pass over the number of data groups on the input tape that is punched into this field. Processing will begin on the data group number following the figure in this first field. The second field is found in card columns 6 through 10. This figure instructs the computer in the number of data groups to process under the current data card control. The computer will process the number of consecutive data groups indicated by the number in this second field. The last field is found in columns 11 through 15. This is an optional field. This field contains the number of EOF on the input data tape. If field three is blank the number of EOF is assumed to be 1. A separate data card must appear in the data card series for each non-consecutive data group to be processed.

A flag card containing nines (9's) in columns 1 through 80 signals the computer to end the job.

PROGRAM FORM

The basic program, SUMARY, is in the form of a 400 card source deck. The general program operation is run from this source deck.

PROGRAM OPERATING PROCEDURE

The procedure for obtaining a production run of SUMARY is to follow this sample procedure.

1. Select the input data tape.

2. Punch the appropriate system control card to request the selected data tape.

3. Determine the data groups to be processed from the input tape.

4. Punch the appropriate data and flag cards.

5. Insert the data cards at the end of the SUMARY source deck.

6. Submit for production run.

CONCLUSION

SUMARY is a FORTRAN Extended computer program designed to (1) generate ordered lists of sound speed data at each of 40 standard levels; (2) select maximum, minimum and eleven percentiles from each ordered list; (3) compute mean, variance, standard deviation and number of observations at each depth; and (4) punch the selected and computed values into a deck of data cards.

The program was written to automatically select and process sound speed data. A simple program modification will permit the selection and procesisng of temperature, salinity or sigma-t data.

Production runs for sound speed data have been run for many ocean areas. Figure 1 is a chart showing 60 ocean regions. NUC Technical Note 1223, Reference 2, discusses the origin of Figure 1. Table III is a summary of the areas shown in Figure 1 for which outputs from SUMARY are available.

A program listing is given in Appendix E.

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Numbers of Marsden ten-degree squares

FIGURE 1. Marsden Square Chart Showing Sixty Designated Ocean Regions

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TABLE III

SUMMARY OF DATA PROCESSED THROUGH SUMARY

	SEASON						SEASON			
AREA	1	2	3	4	AREA	1	2	3	4
101	X	X	X	X	201	X	X	X	X
102	X	X	X	X	202	X	X	O	X
103	X	O	X	X	203	X	X	X	X
104	X	X	X	X	204	X	X	X	X
105	X	X	X	X	205	X	X	X	X
106	X	X	X	X	206	X	X	X	X
107	X	X	X	X	207	O	X	X	X
108	O	O	O	O	208	X	X	X	X
109	X	O	X	X	209	X	X	X	X
110	X	X	X	X	210	X	X	X	X
111	X	X	X	X	211	X	X	X	X
112	X	X	O	O	212	X	X	X	X
113	O	X	O	O	213	X	X	X	X
114	X	X	X	X	214	X	X	X	X
115	X	X	X	X	215	X	X	X	X
116	X	X	X	X	216	X	X	X	X
117	X	X	X	X	217	X	X	X	X
118	X	X	X	X	218	O	X	X	X
119	X	X	X	X	219	X	X	X	X
120	X	X	O	X	220	X	X	X	X
					221	O	O	O	X

Note:

X = Data processed through SUMARY

O = Data not processed through SUMARY

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REFERENCES

1. Naval Undersea Center Technical Note 1059, <u>Status Report on Summary Sound Speed Profile Data Atlas</u>, John J. Russell, March 1973.

2. Naval Undersea Center Technical Note 1223, <u>Documentation for Computer Program TPCONV: A Computer Program to Organize Selected Oceanographic Station Data on Magnetic Tape</u>, John J. Russell, October 1973.

APPENDIX A

REQUIRED MAGNETIC TAPE FORMAT FOR INPUT TO SUMARY

TPCONV OUTPUT DATA TAPE FORMAT

WORD	DATA	BITS	BIT POSITIONS
1	Label for the area	15	(46-60)
	Blank	5	(41-45)
	Standard depth indicators	40	(1-40)
2	Latitude	19	(42-60)
	Longitude	20	(22-41)
	Day	10	(12-21)
	Month	4	(8-11)
	Year	7	(1-7)
3	Marsden Square	15	(46-60)
	Layer depth	15	(31-45)
	Layer sound speed	15	(16-30)
	Blank	9	(7-15)
	No. of standard levels	6	(1-6)
4	In-layer gradient	15	(46-60)
	Below-layer gradient	15	(31-45)
	Axis depth	15	(16-30)
	Axis sound speed	15	(1-15)
5	Sound speed	15	(46-60)
	Temperature	15	(31-45)
	Salinity	15	(16-30)
	Sigma-t	15	(1-15)

Repeat word 5 for each recorded standard level.

Standard recorded depths in meters: 0, 10, 20, 25, 30, 35, 50, 75, 100, 125, 150, 200, 250, 300, 400. 500, 600, 700, 800, 900, 1000, 1100, 1200, 1250, 1300, 1400, 1500, 1750, 2000, 2500, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000, 11000, 12000.

Start each new station with a new word 1.

Maximum of 511 words per record.

Three special records are placed at the end of each data group.

FORMAT FOR THREE SPECIAL RECORDS FOLLOWING A DATA ASSEMBLY GROUP

Record 1 - 5 words

WORD	DATA	BITS	BIT POSITIONS
1	Area label	15	(46-60)
	Blank	45	(1-45)
2	No. records output	30	(1-30)
	Blank	30	(31-60)
3	No. stations accepted	30	(1-30)
	Blank	30	(31-60)
4	Length of output data	30	(1-30)
	Blank	30	(31-60)
5	Zeros	60	(1-60)

Record 2 - 5000 words

This record contains a geographical distribution map of data assembled in the current data group. The record is written as MAP (Latitude, Longitude), where latitude goes from 1 to 50 and longitude from 1 to 100.

Record 3 - 1200 words

This record contains a time distribution by months and years table of data assembled in the current data group. The record is written as MYCNT (Year, Month), where year goes from 1 to 100 and month from 1 to 12.

The three 5, 500, and 1200 special word records separate data groups.

One EOF occurs at the end of data on the tape.

DEPARTMENT OF THE NAVY

Memorandum

DATE: **30 April 1974**

FROM.   J. J. Russell, Naval Undersea Center

TO: Distribution

SUBJ   Changes to NUC TN 1224, Documentation for Computer Program SUMARY: A Computer
Program to Summarize Sound Speed Profile Data, dated October 1973

    1.   Enclosed revised Appendix B replaces same in original NUC/TN 1224.

J. J. RUSSELL

APPENDIX B

OUTPUT DATA CARD FORMAT

SUMARY OUTPUT DATA CARD FORMAT

CARD NO.	CARD COLUMNS	DATA
1	2-5	Maximum
	7-10	10th percentile
	12-15	20th percentile
	17-20	30th percentile
	22-25	40th percentile
	27-30	5Cth percentile
	32-35	60th percentile
	37-40	70th percentile
	42-45	80th percentile
	47-50	90th percentile
	52-55	Minimum
	57-60	1st quartile
	62-65	3rd quartile
	69-70	Depth number (see Note 4)
	71-75	Number of observations
	77-80	Numerical area label
2	1-10	Standard deviation - decimal
	11-20	Variance - decimal
	21-30	Number of observations - decimal
	31-40	Mean sound speed minus 1000.0000 decimal
	55-56	Depth number - integer
	58-62	Number of observations - integer
	66-68	Numerical area label
3	1-80	Repeat of Card 1 format for depth 2
4	1-80	Repeat of Card 2 format for depth 2

.
.
.

79	1-80	Repeat of Card 1 format for depth 40
80	1-80	Repeat of Card 2 format for depth 40
81	1-80	99...9 mandatory flag

NOTES:

1. There are two cards for each of 40 depths.

2. Card formats 1 and 2 are repeated for each of the 40 depths.

3. Depth number is the sequence number of depth value in the following list.
   0, 10, 20, 25, 30, 35, 50, 75, 100, 125, 150, 175, 200, 250, 300, 400, 500, 600, 700, 800, 900, 1000, 1100, 1200, 1250, 1300, 1400, 1500, 1750, 2000, 2500, 3000, 4000, 5000, 6000, 7000, 8000, 9000, 10000, 11000, 12000.

4. All percentile sound speed values (C) of card & type are recorded (10C-10000).

5. All depth values are in meters.

6. All sound speed values are in meters per second.

APPENDIX C

TYPICAL OUTPUT CARD DECK LISTING

```
                    
5460 5435 5428 5417 5415 5410 540
   2.7092      7.8350  115.0000
5460 5433 5427 5418 5415 5410 5400
   2.8173      7.9372  115.0000   540.8000
    0    0      0    0     0    0      0       0        0      0    0 2184
   0.0000      0.0000    0.0000
5458 5433 5425 5416 5415 5407 5393 5386 5375 5363 5305 5422 5360    116 2184
   2.9004      8.4121  116.0000   540.1310           5   116  2184
    0    0      0    0     0    0      0       0        0      0    0 2184
   0.0000      0.0000    0.0000                    6    0  2184
5451 5430 5425 5420 5410 5400 5390 5380 5365 5355 5311 5422 5375   7  117 2184
   3.1531      9.9422  117.0000   539.6094           7   117  2184
5451 5423 5413 5406 5396 5382 5368 5361 5351 5330 5290 5408 5354    8  117 2184
   3.5117     12.3318  117.0000   538.1487           8   117  2184
5453 5413 5390 5390 5381 5366 5360 5347 5337 5316 5268 5395 5342    9  115 2184
   3.5634     12.7009  115.0000   536.7548           9   115  2184
5430 5395 5382 5372 5365 5355 5343 5331 5321 5306 5248 5376 5330   10  115 2184
   3.4935     12.2042  115.0000   535.2704          10   115  2184
5405 5373 5360 5352 5342 5335 5325 5315 5305 5295 5235 5357 5310   11  115 2184
   3.2905     10.8273  115.0000   533.4043          11   115  2184
5357 5335 5316 5302 5293 5286 5281 5275 5266 5250 5202 5307 5270   12  115 2184
   3.1000      9.6102  115.0000   528.9539          12   115  2184
5331 5291 5286 5256 5245 5235 5228 5216 5210 5193 5101 5257 5213   13  115 2184
   2.6816     10.5540  115.0000   523.6330          13   115  2184
5275 5233 5215 5203 5190 5183 5171 5160 5147 5120 5047 5206 5156   14  115 2184
   4.5210     26.4432  115.0000   517.8739          14   115  2184
5197 5127 5107 5097 5071 5060 5046 5036 5016 4991 4931 5102 5031   15  115 2184
   5.4411     29.6052  115.0000   506.0130          15   115  2184
5107 5030 5000 4986 4972 4958 4951 4941 4935 4907 4872 4995 4937   16  113 2184
   4.6435     21.5025  113.0000   496.5920          16   113  2184
5017 4955 4936 4917 4908 4896 4887 4881 4876 4866 4845 4923 4878   17  113 2184
   3.4663     11.5620  113.0000   490.4522          17   113  2184
4936 4901 4892 4878 4871 4863 4860 4853 4850 4843 4831 4885 4851   18  112 2184
   2.2676      5.1421  112.0000   486.9196          18   112  2184
4882 4867 4862 4856 4848 4845 4841 4840 4836 4831 4816 4857 4836   19  106 2184
   1.4700      2.1619  106.0000   484.7630          19   106  2184
4866 4855 4846 4841 4838 4836 4835 4832 4830 4826 4813 4843 4831   20  100 2184
   1.0562      1.1155  100.0001   483.8500          20   100  2184
4855 4846 4842 4837 4836 4835 4833 4831 4828 4825 4820 4841 4831   21   73 2184
    .8062       .6500   73.0000   483.5466          21    73  2184
4851 4846 4842 4840 4837 4836 4835 4832 4831 4828 4825 4841 4831   22   60 2184
    .6337       .4087   60.0000   483.6750          22    60  2184
4851 4848 4847 4843 4842 4841 4840 4838 4837 4836 4831 4843 4836   23   17 2184
    .5199       .2703   17.0000   484.1176          23    17  2184
    0    0      0    0     0    0      0       0        0      0    0   24    0 2184
   0.0000      0.0000    0.0000         I         24    0  2184
4855 4855 4855 4853 4852 4852 4850 4850 4845 4845 4843 4853 4850   25    7 2184
    .4298       .1848    7.0000   485.0145          25    7  2184
4860    0      0 4860 4860 4860 4860 4860 4857 4857 4857    4857   26    8 2184
    .1414       .0200    2.0000   485.9000          26    2  2184
4871    0      0 4871 4871 4871 4871 4871 4866 4866 4866    4866   27    8 2184
    .2620       .0800    2.0000   486.9000          27    8  2184
4891    0      0    0 4891 4891 4891 4891 4891 4891 4891    4891   28    1 2184
   0.0000      0.0000    1.0000   489.2000          28    1  2184
4922    0      0    0 4922 4922 4922                               29       2184
   0.0000      0.0000    1.0000   492.3000
4996    0      0    0 4996 4996 4996                               30       2184
   0.0000      0.0000    1.0000   499.7000
                      0 4986 5000                                  31
   0.0000      0.0000    1.0000   500.0000
5258    0      0    0 5258 5258 5258                               32    1 2184
   0.0000      0.0000    1.0000   525.0000
5441    0      0    0 5441 5441 5441 5441 5441 5441              33    1 2184
   0.0000      0.0000    1.0000   544.0000          33    1  2184
5627    0      0    0 5627 5627 5627 5627 5627 5627    5627   34   34    1 2184
   0.0000      0.0000    1.0000   562.8000          34    1  2184
5817    0      0    0 5817 5817 5817 5817 5817 5817    5817   35        1 2184
   0.0000      0.0000    1.0000   581.8000          35    1  2184
6010    0      0    0 6010 6010 6010 6010 6010 6010    6010   36        1 2184
   0.0000      0.0000    1.0000   601.0000          36    1  2184
    0    0      0    0     0    0      0       0        0      0    0   37    0 2184
   0.0000      0.0000    0.0000         I         37    0  2184
    0    0      0    0     0    0      0       0        0      0    0   38    0 2184
   0.0000      0.0000    0.0000         I         38    0  2184
    0    0      0    0     0    0      0       0        0      0    0   39    0 2184
   0.0000      0.0000    0.0000         I         39    0  2184
    0    0      0    0     0    0      0       0        0      0    0   40    0 2184
   0.0000      0.0000    0.0000         I         40    0  2184
99999 199999 999999 9990 99999999999999999999999999999999999999999999999999999999
```

APPENDIX D

DATA CARDS FORMAT

SUMARY DATA CARD FORMAT

CARD COLUMNS	LEGAL CHARACTERS	NOTES
1-5	Integers	No. of data groups to skip on input data tape before reaching the first data group to be processed.
6-10	Integers	No. of consecutive data groups to process
11-15	Integers or blank	No. of files on input data tape. Blank implies 1 file.

Additional data cards, one for each non-adjacent continuous sequence of data groups.

1-80	999···9	Mandatory flag following last data card.

APPENDIX E

SUMARY PROGRAM LISTING

```
GOJRA,CM55000,LL77,TU2,T777,S3,RUSSELL/DEV. DEPT X2817
COMMENT, PLEASE DO NOT DROP. JOB USES MUCH MORE PP THAN CP TIME. JOB NOT LOOPING
FTN(L,R=3,OPT=2,A)
RFL,15U000.
REQUEST TAPE1,L. RING OUT TAPE1=RES038
LGO.
EXIT.
RETURN(TAPE1)
R
      PROGRAM SUMARY(TAPE1,INPUT,PUNCH,OUTPUT,TAPE2)
      DIMENSION IBIN(5000),SS(400,40),C(20000),CP(9),IFET(9),NO(40),
     XICP(40),MAP(50,100),MYCNT(100,10),BIN(5000),NINE(80),IZTAB(40)
      EQUIVALENCE (IBIN,MAP),((BIN,MY,NT),(IBIN,BIN)
      COMMON SS,C
      DATA (IZIAB(I),I=1,40)/0,10,20,25,30,35,50,75,100,
     X125,150,200,250,300,400,500,600,700,800,900,1000,1100,1200,1250,13
     X00,1400,1500,1750,2000,2500,3000,4000,5000,6000,7000,8000,9000,100
     X00,11600,12000/
   20 NOGP=0
      NOGTP=0
      NEOFTP=0
      NEOFP=0
      IPE2=0
      READ 500,NOGTS,NCGTP,NEOFTP
      PRINT 503,NCGTS,NOGTP,NEOFTP
      IF(NOGTS-9999)21,275,21
   21 IF(NOGTS,22,35,22
   22 DO 30 J=1,NOGTS
   25 BUFFER IN(1,1)(IBIN,IBIT(5000))
      IF(UNIT(1))28,26,27
   26 NEOFP=(NEOFP+1)
      PRINT 567,NEOFP
      IF(NEOFP-NEOFTP)28,28,275
   27 PRINT 568,J,NEOFP
      IPE2=(IPF2+1)
```

E-2

```
     IF(TPE2-25)25,25,323
28   LNGTH=LENGTH(I)
     PRINT 501,LNGTH
     IF(LNGTH-1200)25,30,25
30   CONTINUE
35   CALL ZILCM(SS,16000)
     NRI=0
     NSI=0
     NST=0
     NRO=0
     NOSL=0
     LWCS=0
     IPE1=0
     CALL ZILCH(NO,40)
     CALL ZILCH(C,2000)
54   CALL ZILCH(IBIN,5000)
55   BUFFER IN(1,1)(IBIN,IBIN+(5000))
     IF(UNIT(1))63,281,360
63   IFET(1)=LENGTH(1)
     PRINT 502, IFET(1)
     IF(IFET(1)-5117),71,64
64   IF(IFCT(1)-5000)301,85,301
71   LWA=IFET(1)
     IF(IFET(1)-5172,55,72
72   I=0
     LWCS=0
     PRINT 53,,LWA
73   IF(I-LWA)74,81,81
74   NSI=(NSI+I
     NST=(NST+1)
     I=(I+1)
     IZBUF=IBIN(I)
     I=(I+2)
     NOSL=LBYTX(1,15,,IBIN(I))
     LWCS=(NOSL*4)+LWCS
     I=(I+1)
     DO 77 K=1,40
     IZ=0
     IZ=LBYTX(K,1,IZB,F)
     IF(IZ-1)77,75,77
75   NO(K)=(NO(K)+1)
     M=NO(K)
     I=(I+1)
     SS(M,K)=0.
     SS(M,K)=LBYTX(46,15,,IBIN(I))
     IF(I-LWCS)77,78,78
77   CONTINUE
78   DO 79 N=1,40
     IF(NO(N)-400)79,85,85
79   CONTINUE
     GO TO 73
81   NRI=(NRI+1)
     PRINT 530, NRI
     GO TO 52
**  400 C VALUES AT 40 STD. DEPTHS NOW IN SS(400,40) ***************
85   DO 94 K=1,40
     L=NO(K)
     IF(L) 90,90,92
90   L=1
     SS(L,K)=99999.
92   BUFFER OUT(2,1)(SS(1,K),SS(L,K))
```

```
 94 IF(UNIT(2))194,317,310
    CONTINUE
    CALL ZILCH(NO,40)
    NST=0
    NRO=(NRO+1)
    IF(IFET(1)-5000)73,101,73
**END OF DATA GROUP*********************************************
101 CONTINUE
    DO 104 I=1,5000
104 IBIN(I)=0
    ENDFILE 2
    REWIND 2
    BACKSPACE 1
    BACKSPACE 1
    BUFFER IN(1,1)(IBIN,IBIN(5000))
    IF(UNIT(1))105,308,309
105 IFET(1)=LENGTH(1)
    PRINT 546,IFET(1)
    IF(IFET(1)-5) 32,106,32
106 LFA=IBIN(1)
    NRO=IBIN(2)
    NSA=IBIN(3)
    LOOPD=IBIN(4)
    PRINT 504,LFA,NRO,NSA,LOOPD,NSI
    CALL ZILCH(IBIN,5000)
    BUFFER IN(1,1)(MAP,MAP(5000))
    IF(UNIT(1))109,310,311
109 IFET(1)=LENGTH(1)
    PRINT 546,IFET(1)
    IF(IFET(1)-5000)322,118,322
**PRINT OUT MAP*************************************************
110 PRINT 535
    PRINT 506, LFA
    PRINT 507
    PRINT 509, (MAP(1,L),L=1,100)
    DO 111 M=2,9
111 PRINT 508, (MAP(M,L),L=1,100)
    PRINT 509, (MAP(10,L),L=1,100)
    DO 113 M=11,13
113 PRINT 508, (MAP( M,L),L=1,100)
    PRINT 510, (MAP(14,L),L=1,100)
    PRINT 508, (MAP(15,L),L=1,100)
    PRINT 508, (MAP(16,L),L=1,100)
    PRINT 511, (MAP(17,L),L=1,100)
    PRINT 506, (MAP(18,L),L=1,100)
    PRINT 508, (MAP(19,L),L=1,100)
    PRINT 512, (MAP(20,L),L=1,100)
    PRINT 506, (MAP(21,L),L=1,100)
    PRINT 506, (MAP(22,L),L=1,100)
    PRINT 513, (MAP(23,L),L=1,100)
    PRINT 508, (MAP(24,L),L=1,100)
    PRINT 508, (MAP(25,L),L=1,100)
    PRINT 510, (MAP(26,L),L=1,100)
    PRINT 508, (MAP(27,L),L=1,100)
    PRINT 508, (MAP(28,L),L=1,100)
    PRINT 515, (MAP(29,L),L=1,100)
    PRINT 509, (MAP(30,L),L=1,100)
    PRINT 508, (MAP(31,L),L=1,100)
    PRINT 516, (MAP(32,L),L=1,100)
    PRINT 508, (MAP(33,L),L=1,100)
    PRINT 508, (MAP(34,L),L=1,100)
```

```
      PRINT 517, (MAP(35,L),L=1,100)
  115 DO 115 M=36,39
      PRINT 503, (MAP( 8,L),L=1,100)
      PRINT 509, (MAP(40,L),L=1,100)
  117 DO 117 M=41,49
      PRINT 506, (MAP( M,L),L=1,100)
      PRINT 509, (MAP(50,L),L=1,100)
      PRINT 507
      PRINT 516
  118 PRINT 525,NSA,LF,
**PRINT OUT MY(NT******************************************** *****************
      BUFFER IN (1,1)((MYCNT,MYCNT(1200))
  119 IF(UNIT(1)) 119,201,305
      IF(ICT(1)-LENGTH(1)
      IF(IFET(1)-1200)306,123,306
  120 PRINT 515
      IYR=0
      DO 122 K=1,100
      IYR=(K-1,
  122 PRINT 526,IYR,(MYCNT(K,J),J=1,12)
  123 N=0
      I=0
      DO 201 I=1,40
**INITIALIZE CM C STORAGE BIN(20000)********************************************
      CALL ZILCH(C,20000)
      PRINT 541,NSI,I
      N=0
      NZ=0
      NOBS=0
  125 NZ=(N2+2)
  120 BUFFER IN(2,1)(IBIN,IBIN(400))
      IF(UNIT(2))127,131,316
  127 IFET(1)=LENGTH(2)
      PRINT 566,IFET(1),NZ,I,K,N
      IF(NZ-I) 125,128,125
  128 K=IFET(1)
      DO 129 J=1,K
      N=(N+1)
  129 C(N)= BIN(J)
      K=(IFET(1))
      NOBS=(NOBS+IFET(1))
      PRINT 552,N,K,NOFS
      DO 130 J=1,39
      BUFFER IN(2,1)(I-IN,IBIN(400))
      IF(UNIT(2))130,131,315
  130 CONTINUE
      GO TO 12,
  131 SUMC=0.
      SCSQ=0.
      XNO=0.
      VAR=0.
      SIGMA=0.
      CTS=0.
      PINC=0.
      XN=0.
      PT1=0.
      IPT1=0.
      PT2=0.
      P13=0.
      PCTL=0.
      N=0
```

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```
      REAINE 2
      CALL ZILCH((CP,9)
      IFGT1=0.
      FGT1=0.
      FGT2=0.
      FGT3=0.
      QTL1=0.
      CQ1=0.
      ICQ1=0
      TGT1=C.
      ITGT1=0.
      TJT2=0.
      TGT3=0.
      QTL3=C.
      ICQ3=0
      CALL ZILCH(ICP,9)
      ICQ1=0
      ICQ3=0
      ICMIN=0
      ICMAX=0
      PRINT 565,NOBS
      DO 143 N=1,NOBS
      IF(C(N).GT.3000.,AND.C(N).LT.9000.)GO TO 134
      C(N)=0.
      GO TO 143
134   IF(NOBS-1)200,136,138
136   IF(C(1))200,200,138
138   IF(C(1)-9000.)140,200,,200
140   C(N)=C(N)/10.
      SUMC=(SUMC+C(N))
      SCSQ=(SCSQ+C(N)**2.)
      XNO=(XNO+1.)
143   CONTINUE
      CMEAN=0.
      CMEAN=SUMC/XNO
      PRINT 55w,SUMC,SCSQ,XNO,CMEAN
      NOM=XNO
      IF(XNO-2)145,144,144
144   VAR=(SCy.-(SUMC**2./XNO))/(XNO-1.)
      SIGMA=(VAR**.5)
145   PRINT 521, VAR,SIGMA,XNO,CMEAN,I
      MSK=MASK(60)
      CALL SORTEXT(C,N,BS,1,0,1,MSK)
      PRINT 505
      PRINT 561,IZTAB(r),LFA
      PRINT 52q,  (C(J),J=1,NOM)
      PRINT 505
      PINC=(XNO/10.)
      DO 181 L=1,9
      XN=L
      PT1 = (PINC *XN)
      IPT1 = PT1
      PT2 = IPT1
      PT3 = (PT1-PT2)
      PCTL=PT2
      IF(PT3.GE..5)PCTL=(PT2+1.)
      K=PCTL
      CP(L)=C(K)
      PRINT 55D,K,L,PINC,PT1,PT2,PT3,PCTL,CP(L),IPT1
181   CONTINUE
      FCT1=(P1.,C*2.5)
```

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```
      IFGT1=FGT1
      FGT2=IFGT1
      FGT3=(FGT1-FGT2)
      QTL1=FGT2
      IF(FGT3.GT..50)QTL1=(FGT2+1)
      K=QTL1
      CQ1=C(K)
      ICQ1=C(K)*10.
      TGT1=(PINC*7.5)
      ITGT1=TGT1
      TGT2=ITGT1
      TGT3=(TGT1-TGT2)
      QTL3=TGT2
      IF(TGT3.GE..5)QTL3=(TGT2+1)
      K=QTL3
      CQ3=C(K)
      ICQ3=C(K)*10.
      ICMAX=(C(1)* 10.)
      ICMIN=(C(NOM)*10.)
      ICQ1=(CQ1*10.)
      ICQ3=(CQ3*10.)
      ICP(1)=CP(1)*10.
      ICP(2)=CP(2)*10.
      ICP(3)=CP(3)*10.
      ICP(4)=CP(4)*10.
      ICP(5)=CP(5)*10.
      ICP(6)=CP(6)*10.
      ICP(7)=CP(7)*10.
      ICP(8)=CP(8)*10.
      ICP(9)=CP(9)*10.
      PRINT 556,ICMAX,(ICP(K),K=1,9),ICMIN,ICQ1,ICQ3,I,NOM,LFA
      PUNCH 527,ICMAX,(ICP(K),K=1,9),ICMIN,ICQ1,ICQ3,I,NOM,LFA
      PRINT 559,SIGMA,VAR,XNO,CMEAN,I,NOM,LFA
      PUNCH 560,SIGMA,VAR,XNO,CMEAN,I,NOM,LFA
  200 SIGMA=0.
      VAR=0.
      XNO=0.
      NOM=0
  201 CONTINUE
      REWIND 2
      DO 270 K=1,80
  270 NINE(K)=5
      PRINT 557,(NINE(K),K=1,80)
      PUNCH 558,(NINE(K),K=1,80)
      NDGP=(NDGP+1)
      PRINT 562,NDGP
      IF(NDGP-NDGTP)35,20,20
  275 REWIND 1
      STOP 77777
  281 PRINT 52,
  282 STOP 66666
  306 CONTINUE
      IPE1=(IPE1+1)
      IF(IPE1.GT.50 )GO TO 302
      BACKSPACE 1
      GO TO 55
  301 STOP 11112
  302 PRINT 550
      PRINT 569,IFET(1),
      GO TO 55
  305 STOP 11115
```

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```
306 STOP 11116
308 STOP 11120
309 STOP 11121
316 STOP 11122
311 STOP 11123
315 STOP 11127
316 STOP 11130
317 STOP 11131
318 STOP 11132
321 STOP 11135
322 STOP 11136
323 STOP 11137
500 FORMAT(3I5)
501 FORMAT(1H ,1X,* LNGTH=*,I5)
502 FORMAT(1H ,* IFET(1)=*, I10)
503 FORMAT(1H ,1X,* ND6TS,NTnTP,NEOFTP=*,3I5)
504 FORMAT(1H ,* LFA, NRO, NSA, LOOPD,NSI=*,5I10)
505 FORMAT(1H1)
506 FORMAT(1H ,/,50X ,*DATA DISTRIBUTION FOR AREA *,I4,//)
507 FORMAT(1H , 15X,*.................................................*)
508 FORMAT(1H , 15X,*.*, 100A1, *.*)
509 FORMAT(1H , 15X,*.*, 100A1, *.*)
510 FORMAT(1H , 9X,*L*, 5X, *.*, 100A1, *.*, 5X, *L0*)
511 FORMAT(1H , 9X,*A*, 5X, *.*, 100A1, *.*, 5X, *A0*)
512 FORMAT(1H , 9X,*T*, 5X, *.*, 100A1, *.*, 5X, *T0*)
513 FORMAT(1H , 9X,*I*, 5X, *.*, 100A1, *.*, 5X, *I0*)
514 FORMAT(1H , 9X,*T*, 5X, *.*, 100A1, *.*, 5X, *T0*)
515 FORMAT(1H , 9X,*U*, 5X, *.*, 100A1, *.*, 5X, *U0*)
516 FORMAT(1H , 9X,*D*, 5X, *.*, 100A1, *.*, 5X, *D0*)
517 FORMAT(1H , 9X,*E*, 5X, *.*, 100A1, *.*, 5X, *E0*)
518 FORMAT(1H ,/,54X,*L O N G I T U D E *)
519 FORMAT(1H1 ,//, *7X, *DATA DISTRIBUTION BY YEARS AND MONTHS*,///,
    X51X,*YEARS*,69X, *MONTHS*)
520 FORMAT(1H , I2, 12(3X,I3))
521 FORMAT(1H ,1X,*VAR,SIGMA,XNO,CMEAN*12=*,4F25.6,*I10)
524 FORMAT(1H ,1X, 2F6.1)
525 FORMAT(1H ,15X I6,* STATIONS IN AREA *,I4)
526 FORMAT(1H ,*END OF FILE*)
527 FORMAT(16I5)
530 FORMAT(1H*,50X,* END OF RECORD *,I7)
536 FORMAT(1H*,25X,* 71 *,I10)
541 FORMAT(1H , * NSI,IZ *,2I10)
546 FORMAT(1H ,1X,* IFET(1)=*,I10)
550 FORMAT(1H ,1X,* PARITY ERROR AT 55 *)
552 FORMAT(1H ,1X,* N,K,NOBS=*,3I10)
554 FORMAT(1H ,1X,6F25.4)
555 FORMAT(1H ,1X,2I5,6F10.1,I5)
556 FORMAT(1H ,1X,19I6)
557 FORMAT(1H ,1X,60I1)
558 FORMAT(80I1)
559 FORMAT(1H ,1X,*4F10.4,3I6)
560 FORMAT(4F10.4,10Y,3I6)
561 FORMAT(1H ,38X,*ORDERED SOUND SPEED VALUES AT *,I5,* METERS FOR AR
    XEA *,I4,//)
562 FORMAT(1H ,1X,* ND6P= *,I5)
563 FORMAT(1H ,1X,*AT 77 *,)
565 FORMAT(1H ,1X,* NOBS=*,I10)
566 FORMAT(1H ,1X,* INPUT BUFFER FROM DISK *,I5,* WORDS *,10X,*NZ,I,K,
    XN=*,4I10)
567 FORMAT(1H ,1X,* EOF *,I3)
```

```
568 FORMAT(1H ,1X,* PARITY ERROR AT 27 *,2I10)
569 FORMAT(1H ,1X,*LENGTH=*,I10)
    END

       IDENT  SORTEXT
       ENTRY  SORTEXT
*   4TRANX CALL SORTEXT(FWA,NUM,KNUM,IDIR,KEWRD,MASK)
SORTEXT
       SX6    A0
       SA6    SAVE
       SA1    A1
       SB1    X1
       SA2    A1+1
       SA2    X2
       SB2    X2
       SA2    A1+2
       SA2    X2
       SB3    X2
       SA2    A1+3
       SA2    X2
       SB4    X2
       SB5    0
       SB6    0
       SA2    A1+4
       SA2    X2
       SB7    X2
       SA2    A1+5
       SA2    X2
       BX0    X2
       RJ     =XSOR+
       SA1    SAVE
       SA0    X1
       JP     SORTEXT

SAVE   END

R  10   1
9999999999999999999999999999
>
```

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WHOI73-59	Tollios, C. D.	THE ACODAC DATA PROCESSING SYSTEM	Woods Hole Oceanographic Institution	730901	AD0773114; ND	U
Unavailable	Russell, J. J.	DOCUMENTATION FOR COMPUTER PROGRAM SUMMARY: A COMPUTER PROGRAM TO SUMMARIZE SOUND SPEED PROFILE DATA	Naval Undersea Center	731001	AD0918907	U
MC001Vol2	Unavailable	CHURCH ANCHOR DATA ANALYSIS PLAN VOL 2 (U)	Maury Center for Ocean Science	731001	ND	U
73-9M7-VERAY-R2	Jones, C. H.	LRAPP VERTICAL ARRAY - PHASE III	Westinghouse Research Laboratories	731105	ADA001130; ND	U
55	Weinstein, M. S., et al.	SUS QUALITY ASSESSMENT	Underwater Systems, Inc.	731201	AD 795 675	U
ARL-TM-73-42	Mitchell, S. K., et al.	QUALITY CONTROL ANALYSIS OF SUS PROCESSING FROM ACODAC DATA	University of Texas, Applied Research Laboratories	731220	ADA ND 000263	U
Unavailable	Daubin, S. C.	CHURCH GABBRO TECHNICAL NOTE: CONTINUOUS CURRENT PROFILES	University of Miami, Rosenstiel School of Marine and Atmospheric Science	740101	AD0775333	U
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ONR MC-002 VOL 2; XONICS 885	Unavailable	LONG RANGE ACOUSTIC PROPAGATION PROJECT (LRAPP). SQUARE DEAL DATA ANALYSIS PLAN (U) VOLUME 2 - ANNEXES	Maury Center for Ocean Science; Xonics, Inc.	740101	ND	U
ARL-TM-74-12	Groman, R. O., et al.	SPECIAL HARDWARE FOR ARL ANALYSIS OF ACODAC DATA	University of Texas, Applied Research Laboratories	740314	ADA000295; ND	U
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